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ABSTRACT

This study at the State University of West Georgia examined barriers and influences to faculty adoption of technology into instruction. The sample for the study was the 348 full-time faculty at the university. A survey was designed to determine the faculty's self-reported knowledge and use of technology, factors influencing their use of technology, and perceived barriers to the use of technology in the classroom. Faculty were also asked about the importance of instructional technology to their teaching and if they would continue to adopt new technology. The following factors influencing use of technology were ranked: improved student learning; advantage over traditional teaching; equipment availability; increased student interest; ease of use; compatibility with discipline; time needed to learn; materials in discipline; compatibility with materials; training; administrative support; personal comfort; and colleague use. The data showed the faculty recognized common barriers to instructional technology as well as influences that helped them overcome the barriers. (Contains 28 references.) (MES)

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Influences and Barriers to the Adoption of Instructional Technology

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ED 446 764

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Abstract

As instructional technology becomes ubiquitous in classrooms, faculty will be asked to utilize new technologies in their pedagogy. Some will accept new ways to teach with technology while others resist. What are factors that influence faculty to adopt this technology and find effective pedagogy to utilize it? The Department of Learning Resources at the State University of West Georgia asked its faculty about influences to technology adoption while creating a plan to tackle technology resistance. The resulting data showed the faculty recognized common barriers to instructional technology as well as influences that helped them overcome the barriers.

Introduction

Why don't we do it in the classroom? (with apologies to the Beatles)

Instructional technologists have asked this question since before we knew there were instructional technologists. Audiovisual specialists and librarians were among the first to ask why faculty members don't use new technology in the classroom? What barriers exist to the integration of technology into pedagogy? The success of our faculty members in adopting technology also impacts the success of our students and ultimately our institution. As the rate of adoption of technology in higher education has increased (Green, 1996, 1998), it is apparent this reflects the explosion of information technology in business and in the home in the 1990s. In this technology age, higher education must prepare students to integrate technology in their learning if our institutions expect to continue to be viable venues for students to prepare for the workforce. If higher education does not provide these instructional technology opportunities to students, it will be a disservice to them (Gilbert & Green, 1997).

Integrating technology into instruction is a critical aspect of the adoption process (Groves & Zemel, 1999). This is supported by the 1998 National Survey of Information Technology in Higher Education (Green, 1998) that showed 33.3% of the respondents reporting that "assisting faculty integrate technology into instruction" was the most important technology issue at their college or university (p. 1).

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A study undertaken in Spring Semester 1999, asked the full-time faculty at the State University of West Georgia (UWG) about the barriers and influences to their adoption of technology into instruction. Their answers showed that UWG instructional technology support staff had already correctly identified many factors influencing faculty adoption of technology. The data also revealed that members of the UWG faculty are increasingly adopting technology and are planning to integrate more technology into

instruction. The data also makes clear what faculty expect in support.

Literature

Michael Albright (1996) said in a keynote address to the Southern Regional Faculty and Instructional Development Consortium that so many barriers have existed in higher education to the adoption of instructional technology that faculty use of technology has been accomplished in spite of the campus environment. He notes that education may be the only business which actually discusses the existence of barriers to its employees' adoption of technology.

Change in higher education has traditionally been slow. In the literature there is a reference to an anonymous quote apparently by a frustrated instructional technologist:

> *The pace of academe is perhaps best measured by the 25 years it took to get the overhead projectors out of the bowling alley and into the classroom (in Gilbert & Green, 1997, p. 25).*

Until the recent past, much information about the adoption of instructional technology has mostly been anecdotal or based on case studies. However, thanks to K.C. Green's Campus Computing Project and other researchers, we have a much better view of higher education faculties and of their use of instructional technology.

The survey in the UWG study is based on a previous survey by Groves and Zemel (1999) from an instrument developed by Spotts and Bowman (1995). The definition of instructional technology used in our study is one that refers to the use of technology to achieve an instructional objective (Spotts & Bowman, 1995). This technology includes computer hardware and software, networks, email, multimedia, and computer peripherals such as CD players. Traditional media such as video and audio are also defined as instructional technology.

A number of factors have been identified as barriers to the adoption of instructional technology. The fear of failure in using the technology is a factor that has been cited as an initial barrier (Hannafin & Savenye, 1993). While faculty members are experts in their content area, they are not experts in the use of technology. The fear that they will not be able to use the technology well in front of their students and colleagues is strong (Armstrong, 1996). Faculty also are afraid that technology will be difficult to use (Byron, 1995). When it is difficult to use, then faculty have problems and often refuse to use it again (Albright, 1996).

Availability of support staff when problems occur is an important factor for faculty using technology (Nantz & Lundgren, 1998). As technology becomes more user friendly, this becomes less of an issue. But as instructors first use instructional technology, the friendly, helping hand of support staff can make the experience easier.

Other anxieties that faculty face with technology are the devaluation of their profession and the possible elimination of their job (Novek, 1996). As distance learning and computer based instruction become more popular, some faculty may wonder if the role of the traditional campus is threatened (Oblinger & Rush, 1997). Faculty also worry that technologies may alienate students and diminish communication and other social skills.

Whether the use of instructional technology in the classroom is effective for teaching is also an issue which faculty consider critical (Byron, 1995). Faculty question whether students' performance will be improved with the use of technology. Research has shown that it is not the technology itself but how the

technology is used that improves learning and increases student interest (Albright, 1996; Charp, 1998). In some institutions where technology is being adopted, faculty believe the integration of technology into instruction increases classroom performance (Luna & McKenzie, 1997). In a survey of California community college faculty, Luna and McKenzie found that 80% of faculty were using multimedia as a form of lecture support. Some 73% of the students reported multimedia to be a positive addition to the course.

Infrastructure development is important to instructional technology. As in the movie, "Field of Dreams," we must build technology so faculty will have a field of play. Without high speed networks there would not be the World Wide Web and efficient email. Development of multimedia classrooms brings computers, the Internet, video, and audio to the easy reach of the faculty. These are factors that students and faculty now consider essential. A study by the U.S. Department of Education reported that institutions recognize that information infrastructure is expected by faculty and students alike (Jacobson, 1996).

Time is always a critical resource for faculty, but time is at a premium with technology. Faculty members relate that it takes time to learn the technology and it takes even more time to develop instructional materials that utilize technology (Hirschbuhl & Faseyitan, 1994; Nantz & Lundgren, 1998). Sammons (1994) states that the lack of time to develop instructional technology materials is a major deterrent to the adoption of instructional technology. Faculty reported spending 15-20 hours a week to develop multimedia lectures and 150-200 hours converting one course to multimedia. Time and resources for development of instructional technology course will continue to be an ongoing issue. Green (1998) says that institutions have not been prepared for the sustained investment in time and support and financial resources needed to develop quality instructional resources.

One of the most important support issues influencing faculty to adopt technology is training (Armstrong, 1996). As faculty adapt technology to their pedagogy and grow in its use, they deserve recognition for their efforts. There must be a reward system that recognizes the adoption and integration of technology into instruction through promotion and tenure (Nantz & Lundgren, 1998). Institutional commitment is a critical element that affects faculty adoption of technology in the academic environment. Institutional and administrative commitment to instructional technology through financial support, infrastructure, and support personnel is essential for the successful development of instructional technology (Albright, 1996).

The Study

The sample for the study was the 348 full-time faculty at the State University of West Georgia. In the 1998 Fall Semester there were 8,667 students, who included 6,600 undergraduates and 2,067 graduate students. The institution has traditionally granted bachelors, masters, and specialist degrees, but recently was approved to grant an Ed.D.

A survey with 61 questions was adapted from an instrument previously used by Groves & Zemel (1999). The survey used in this study is almost identical to the Groves and Zemel instrument. Questions were designed to determine the faculty's self-reported knowledge and use of technology, factors influencing their use of technology, and perceived barriers to the use of technology in the classroom. Faculty were also asked about the importance of instructional technology to their teaching and if they would continue to adopt new technology (Groves & Zemel, 1999). There were 156 surveys returned by campus mail for a return of 44%.

Results

One hundred fifty-seven surveys were returned and usable. Forty-four percent (n=157) of the faculty

returned surveys. The faculty ranks of the respondents were instructor (8.9%), assistant professor (42%), associate professor (19.7%) and professor (27.4%). There were 68 respondents (45.3%) who reported one to ten years experience in higher education. Forty (26.7%) said they had 11-20 years experience while 20% (n = 30) had 21-30 years experience. There were 12 (8%) who had 31-40 years in higher education. Seven (4.5%) did not report experience.

When it came to computer ownership, almost 90% said they had computers at home. One hundred five respondents (66.9%) reported they have an IBM compatible computer at home while 21 faculty (13.4%) said they used a MacIntosh. Nine faculty (5.7%) said they have both Mac and PC at home. Seventeen (10.8%) reported they have no home computer.

Faculty were asked about the importance of 13 factors influencing the use of instructional technology. They were asked to rate the importance of the factors on a five-point Likert scale (1 = not important; 2 = somewhat important; 3 = important; 4 = very important; 5 = critically important). The influencing factors have been grouped into three categories that include 1) instructional and learning issues, 2) equipment access and training, and 3) instructional materials, discipline-specific factors, and other issues.

Instructional issues ranked highest overall as influencing factors in the adoption of instructional technology. Improved student learning ranked first with 89.1% (n = 139) of the respondents rating it very important or critically important as an influence. Forty nine percent (n = 77) rated it critically important (Figure 1). Clear advantages over traditional delivery was also rated highly as an influence by faculty with 80% (n = 124) of the faculty rating it very important and critically important (Figure 2). Increased student interest rated very important or higher by 70.5% of the respondents.

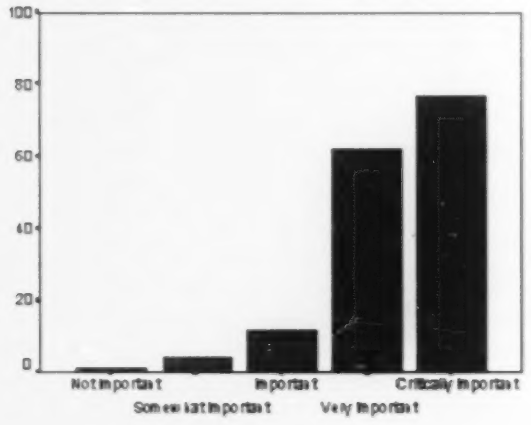

Figure 1. Improved student learning

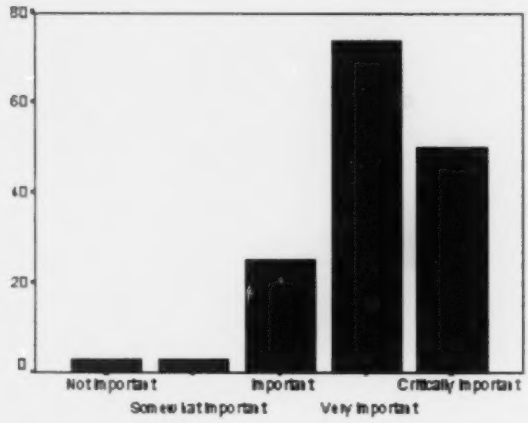

Figure 2. Clear advantages over traditional

Equipment access and training were also highly influential factors with faculty. Equipment availability was ranked second overall as an influence. Almost 89% (n = 138) ranked equipment availability as very important or critically important. Sixty-two percent rated it as critically important (Figure 3).

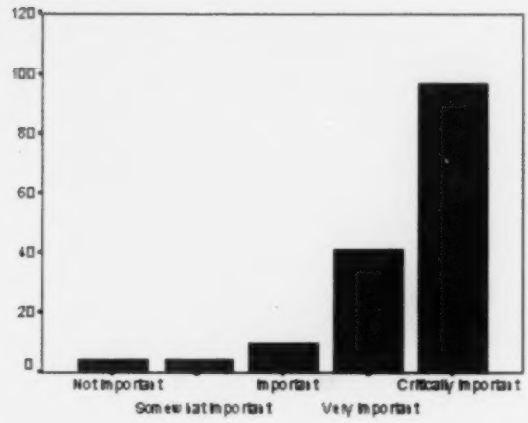

Figure 3. Equipment availability

Instructional technology's ease of use was rated very important or higher by 74.4% (n = 116) of the faculty (Figure 4). The time needed to learn how to use instructional technology was also ranked very important or higher by 72% of the faculty (n=113). Nine percent (n=14) said it was somewhat important or less (Figure 5). Training for faculty received very important or higher marks by 68.8% (n = 108) of the respondents.

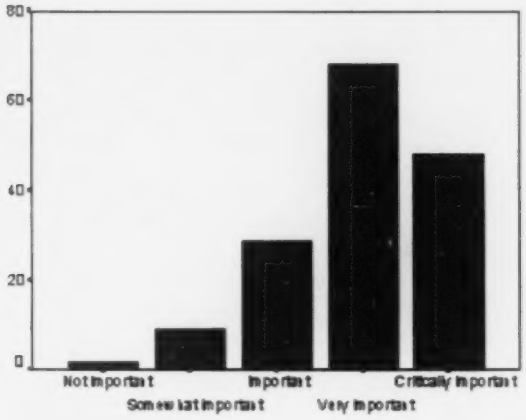

Figure 4. Technology ease of use

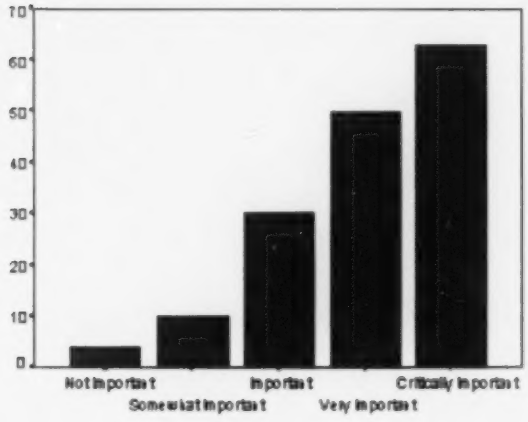

Figure 5. Time to learn technology

Funding for technology instructional materials rated very important or higher by 78.9% (n = 123). The compatibility of technology with existing instructional materials was considered very important or higher by 62% of the faculty. The compatibility of technology with a faculty's discipline was reported to be very important or higher by 71% of the respondents.

Frequent use by department colleagues was rated low as an influence. Sixty-four percent (n = 99) ranked it somewhat important or not important. Twenty-four percent (n = 37) rated it as important. Only 12.8% (n = 20) rated it as very important or critically important (Figure 6). Approximately 80% (n = 83) rated administrative support very important or critically important (Figure 7).

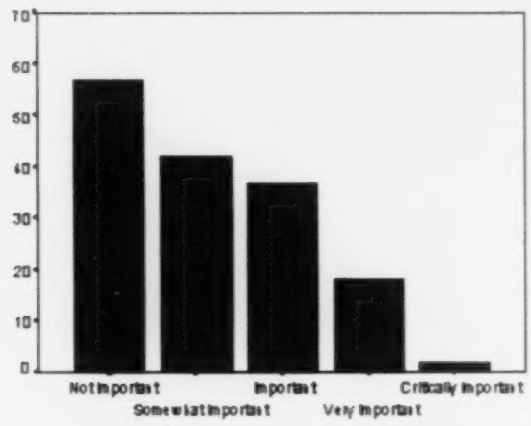

Figure 6. Use by colleagues

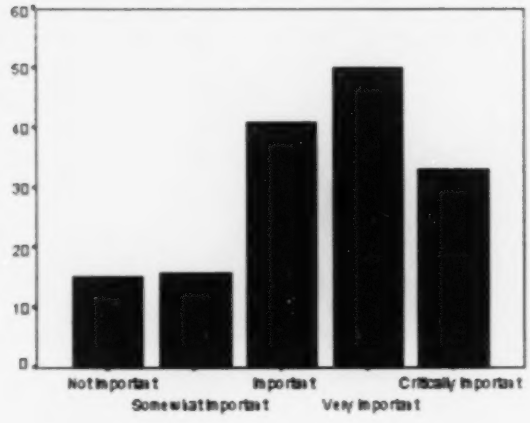

Figure 7. Administrative support

A faculty member's personal comfort level with technology rated very and critically important with 53.8% (n = 84) of the respondents. Twenty-two percent (n = 34) rated it somewhat important or not important.

Of the respondents, 53.2 % (n = 83) reported that instructional technology was very important or critically important to their teaching. Twenty-four percent said technology was important to instruction. Twenty-three percent (n=35) said instructional technology was somewhat important or not important.

Faculty were also asked about barriers to the adoption of technology. Six barriers to the adoption of technology were listed along with one open-ended question as an opportunity for a respondent to identify a specific, but unlisted barrier the respondent considered important.

Lack of time received the top barrier ranking with 66.9% (n = 111) of the respondents marking very

important or critically important (Figure 8). Lack of easily accessible equipment was listed a very important or critically important barrier by 58.2% of the respondents (Figure 9). A lack of training ranked close behind with 51% of the respondents stating it was a very or critically important barrier.

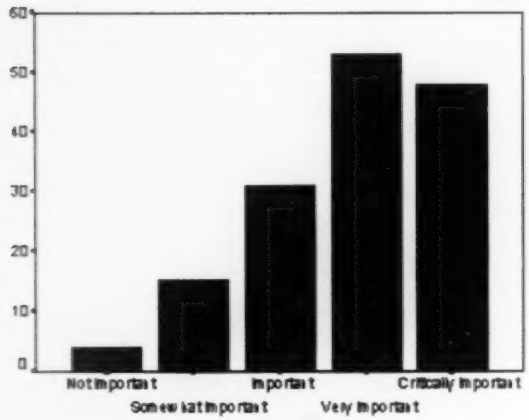

Figure 8. Lack of time

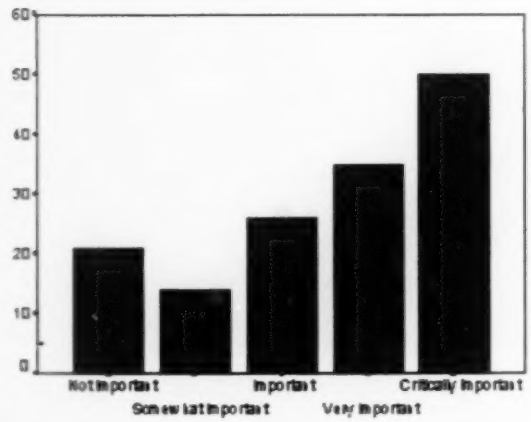

Figure 9. Lack of equipment

A lack of personal interest in technology received the lowest barrier rank with 70.4% (n = 100) of respondents rating it somewhat important or not. A lack of relevance to a faculty's discipline was rated as not important by 47.9% (n = 70) of faculty and somewhat important by 17.1% (n = 25) of faculty. Lack of contribution to professional development was rated not important or somewhat important by 61.4% (n = 89) of faculty.

No new barriers were added by respondents in the open ended question, but several faculty used the opportunity to make comments about the time commitment to learn technology and develop instructional materials, voice concerns as to whether technology can enhance learning, and to express frustrations with instructional technology.

Conclusions

The factors that influence faculty to adopt technology in this study and the Groves and Zemel study (1999) from which this study was adapted were rated and ranked similarly. The top two influences to the adoption of instructional technology in this survey are instructional issues - improved student learning (96.8% important to critically important), and clear advantages over traditional methods (96.1% important to critically important). These results differed somewhat in rankings with the Groves and Zemel survey, which ranked equipment availability first with 97% and then followed by improved student learning at 97%. Equipment availability (94.9% important to critically important) ranked third in the UWG study. Increased student interest (93.6% important to critically important) was ranked fourth in this study but ranked third in Groves and Zemel at 96%. This suggests that UWG faculty perceive that technology must have a significant impact on instruction for faculty to adopt its use even though the technology must be available.

Other equipment factors that ranked high were ease of use (93% important to critically important), time to learn technology (91% important to critically important), and training (86.6% important to critically important). The high rankings also reflect critical factors for faculty, which perceive that time to learn technology and training in technology are essential. These factors ranked comparably with the Groves and Zemel study and in the same ranking order. Personal comfort level (78.2% important to critically important), even though above a majority, does not seem to have a major impact compared to pedagogy and hardware issues. Personal comfort level rated similarly in the Groves and Zemel survey at 80%.

The second lowest rated influence with positive ranking was administrative support with 80.1% rating it important to critically important. As an influence, faculty perceive administrative support technology as necessary to instructional technology but not necessarily critical. Least important of the influences to adoption in both this study and Groves and Zemel was technology use by colleagues. It seems the technology that a colleague is utilizing in class does not sway the respondents to adopt similar technologies. This was the only influence that faculty rated negatively with 36.5% reporting that it was not important and another 26.9% saying it was only somewhat important (Table 1).

Table 1. Factors influencing use of technology

	Factors influencing Use of Technology *			
	UWG	UWG rank	Groves & Zemel	G & Z rank
Improved student learning	97	1	97	2
Advantage over traditional teaching	96	2	92	4
Equipment availability	95	3	97	1
Increased student interest	94	4	96	3
Ease of use	93	5	91	5
Compatibility with discipline	93	6	86	8
Time needed to learn	91	7	91	6
Materials in discipline	90	8	83	9
Compatibility with materials	90	9	77	12
Training	87	10	87	7
Administrative support	80	11	80	11
Personal comfort	78	12	80	10
Colleague use	13	13	35	13
	* very importantly to critically important			

Issues of influences and barrier are not only linked but in many cases are opposite sides to certain factors. The top three barriers were equipment-oriented issues that also ranked high as influences - lack of time (87.4% important to critically important), lack of equipment (76% important to critically important), and lack of training (75.8% important to critically important). These factors reflected their comparable influences in their importance to faculty.

Three factors that received strong negative ratings as barriers were lack of interest in technology (70.4% not important to somewhat important), lack of relevance to the discipline (65% not important to somewhat important), and, surprisingly, lack of contribution to professional development (61.4% not important to somewhat important). With pedagogical issues ranking as such strong influences, faculty seem to be saying that the student is the focus and not the teacher.

How significant is instructional technology perceived to be? More than half of faculty in this survey (53.2%) said technology is essential to instruction with 83 respondents noting it is very important or critically important. Another 24.4% (n = 38) said it is, at least, important. These results were higher than reported by Grove and Zemel who found that 46% said it was very important or critically important. Spotts and Bowman (1995) reported 38% rated instructional technology very important or critically important.

A majority of the faculty also said there were incentives to the adoption of technology (65.9%), but it seems they have a variety of ideas about the definition of incentives. "If it improves learning, that's

enough incentive," said a Professor in the College of Arts and Sciences. Yet another Assistant Professor in the College of Business stated, "Use is a disincentive because of all the time and energy it requires that can't be used for other professional/teaching assignments. " A College of Education Instructor said, "There is a push, but no incentives. " One Assistant Professor in the College of Arts and Sciences said "Yes, but I don't want incentives, there's too much pressure to use technology when it is not appropriate to my field." And yet an Assistant Professor in the College of Arts and Sciences said, "No, but there should be. "

In conclusion, faculty have pointed out influences that are important. The environment at the State University of West Georgia has become more conducive to the adoption of technology. An Associate Professor in the Library stated in the survey, "It is obvious that the climate on this campus rewards those who appear, at least, to be innovative." There is strong administrative support for technology. The President and Vice President of Academic Affairs are active in the use of new instructional technology, supportive of technology through funding and have encouraged the adoption of a technology plan which has been created by a faculty/technology staff committee. Faculty have stated that equipment availability is important and there has been an on-going development of campus networks as well as video and multimedia development in the classrooms. The academic deans have committed significant funds to the development of multimedia. One college's classrooms are all multimedia and the other has almost all multimedia classrooms. Faculty said training is important and there have been extensive training programs. A strong distance learning department exists and fully on-line programs continue to be developed.

One important aspect of technology adoption may be that the adoption of technology has passed the self-sustaining point on Rogers' diffusion of innovation adoption curve (1995). The early adopters at UWG have blazed the trail. The early majority has proven that instruction technology is effective. And now, as 53% say it is very important or critically importing to their teaching, instructional technology is simply being integrated by the late majority as just part of their pedagogy.

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